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Standard Costs—How to Establish and Apply Them

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STANDARD COSTS—HOW TO ESTABLISH AND APPLY THEM

In its broad sense an accounting system may be regarded as a machine for the production of information pertaining to the cost and progress of manufacturing operations. The value of such a system is determined by the extent and character of the information obtained, the speed with which such data is produced and the cost of compilation.

Objects of a System

A system of accounting should provide the following information:—

1—Monthly statements of profit and loss by classes of product.
2—Complete information relative to operating efficiencies.
3—Cost data so arranged that a current cost of various articles can be obtained quickly.
4—Information in regard to the progress of work through the factory.

In order to obtain these results a system should be designed as to operate at moderate clerical expense.

The generally accepted plan, under which detail costs are compiled for every operation and every repetition of an operation, falls short of obtaining the above results. The purpose of a detailed cost plan is to obtain information relative to the actual cost of manufacture, but in practice, such data are of very little value as the information most often required is the costs under current condition and not past costs. Furthermore, if it is desired to bring such information into such a statement as a monthly profit and loss statement by classes of product, it cannot be done without a great amount of clerical help.

Standards As Units of Measurement

In all of the business activities of to-day we hear a great deal about the use of standards. In nearly every department of the modern concern some standard or mark is set for which to strive.

These standards may be in the form of a budget, a quota or any of the many terms with which the modern business is familiar. Accountants are rather slow to adjust themselves to this new way of thinking and are rather reluctant to give up our old methods of writing history. If standards are set why should accountants not be interested in designing accounts so that a comparison of actual

conditions with the predetermined results will be shown in statements?

Such a system would be based upon the principle that the comparison of periodical costs can be more satisfactorily stated as a comparison with a common unit of measurement, such as a standard cost, than with the cost of a previous period. For example, a better idea of the trend of costs is conveyed by stating that during January the cost of production to standard was 120%, and that during February the cost was 132%, than by stating that during February the cost was 110% of January and that the latter probably 90% of the previous January. There is no means in the latter method of deciding whether the figure of the January previous was high or low, except by a similar comparison when again the comparison is lacking in significance.

In all similar commercial activities a common unit of measurement is used, as for instance, a road contractor would not say that his last job cost $100,000 and it was twice the previous one, but would state that the former cost $1,000 per mile and the latter $2,000. The costs of both jobs are compared with the same standard, namely, the mile.

In designing a cost system the first problem is the establishment of some unit of measurement. There are but few lines of manufacturing which lend themselves to the setting of such a unit of measurement so that all activities can be measured to that unit.

Under the standard cost plan there may be any number of units of measurement. These units are brought together in a cost which is known as standard cost and is used throughout the accounting procedure as the unit of measurement.

Standard costs are established for each article manufactured. Standard costs may or may not closely approximate actual costs at the time of establishment. The aggregate standard costs of all articles passing through the factory during a given period are compared with the actual costs for the same period. This will give a ratio of actual cost to standard cost in total. The application of this ratio to the standard cost of any article will give the current cost of that article.

In a general way the foregoing explains the principle of standard cost but owing to the fact that it rarely happens that all articles are started and finished in the same period, refinements are necessary to obtain a true figure of cost. These refinements do not alter the principle in any way but only serve to more accurately reflect the actual condition.

Setting Standards

Before such a plan as outlined can be placed in operation it is necessary to set standard costs for all articles manufactured. These standard costs are arranged to conform to the manufacturing procedure. The main items are material, material scrap, labor and factory burden. In our company the standard costs are mainly based upon records which already exist. A standard unit price is set for

all material and scrap. The specified amounts of material and scrap for each article are entered in detail on the Standard Cost card and extended at the standard unit cost. These data are very easy to obtain for records are kept in the production department showing the quantity and kind of material to be used for each article.

Standard rates of pay are set for each department which are based upon the average earnings at the time the system was introduced. Standard time is set for each operation which in most cases is based upon detail costs already in the files and where there are none, time studies are made. The standard time is shown on the Standard Cost card for each operation and the total Standard time for each department is extended at the standard rate for that department which gives the standard cost of the direct labor. To this standard labor cost the standard burden rate for each department is applied. By combining these elements of the Standard cost for each article we have set up a complete Standard cost. These costs are arranged and filed by article numbers and in such order so that they can be easily referred to. The standard cost is now used in the accounting, in about the same manner as a price list is used for billing, for setting up the standard cost against the actual production as reports are received.

Pay Roll Distribution

Time tickets are issued for each operator daily showing the following:—Date, man number, department, total time for the day, hourly rate of pay, operation, number of pieces completed and description of article.

These tickets are gathered together daily, checked to the in and out record, and the total time extended at the day rate and the amount credited to the operator.

As soon as this procedure is accomplished the tickets are passed to the Cost Department where reference is made to the standard cost, and the standard time for each operation is posted to the ticket and extended by the quantity completed.

The time tickets are now ready for distribution, which is done by sorting each department's tickets by classes of product, seperating the day work from the piece work and tabulating the standard hours, actual hours and actual amounts. These tabulations are done in one operation through the use of a non-listing machine. The amounts are posted to columnar sheets which are provided for showing this information by classes of product in each department.

The standard hours for each department are totaled monthly and extended at the standard rate which gives the standard labor cost of each department. This standard cost and the actual cost are posted in parallel columns to the debit side of the work in process accounts by lines of product and the relation between the two expressed by means of the ratio of the actual cost to the standard.

In most of our plants the time tickets are first tabulated by employees and the relation between the actual and standard time is

shown in weekly comparative reports. These reports are passed to the foreman of each department who show keen interest in them and they have been used as a means of determining the worth of operators.

In the case of piece work we have considered our piece work prices as standard which eliminates the necessity of placing the standard time on the tickets.

In some departments where it is not possible to have the operator show the actual work done, such as the plating department, the production is reported for the department as a whole or in groups, such as a vat in plating or for a gang in the annealing room. These reports are priced at standard cost and treated in the same manner as if distributed to the operator.

If it is desired to ascertain the number of hours of running time of each department in advance, this can be done by figuring the standard time of each production order at the time it is issued and crediting against this the standard time of the work produced. This procedure will give the number of standard hours ahead of each department.

Material

The material accounts are divided into a few main classes arranged according to the general description of the material concerned. Each main class is sub-divided according to each kind of material. Two sets of accounts are maintained, the controlling account which relates to the main class only and is carried at both actual and standard figures. The detail accounts are carried at quantities only. The controlling accounts are carried on the factory ledger and the detail accounts are maintained by the storekeeper. Charges to these accounts are made from the vendors' invoices, which in preparation for recording are priced at the standard cost.

The total of all charges at actual cost are charged to the inventory controlling account for the factory, and the sub-division of the inventory accounts are charged with the actual and standard cost. These two amounts are shown in parallel on the debit side of each account and the relation between the two is shown by dividing the actual cost by the standard. This ratio is used in issuing credits to the accounts, as explained later. The quantities are posted to the detail accounts on the stock cards.

Withdrawals of material are made upon a requisition which is designed to show the following information:

1—Material account number, which number indicates both the control account and the sub-division of the account.
2—Actual quantity issued.
3—Standard cost of actual quantity issued.
4—Standard cost of material in product.
5—Class of product.
6—Production order number.

As the material is issued by the storekeeper the quantity issued is recorded and the quantity extended at the standard cost of the material. Reference is now made to the standard cost of the article for which the material is issued and the standard cost of the material in the product is posted to the requisition.

Monthly or as often as may be desired the requisitions are sorted by classes of material and credits are made to the controlling account at standard cost, which is adjusted to actual cost by the use of the ratio between actual and standard cost as shown on the debit side of the account. This difference between the actual and standard cost will reflect the variation due to the actual price being more or less than standard. Inasmuch as the quantity of material used in the article may vary it is necessary to provide for showing this condition. In order to do so the requisitions are now sorted by classes of product and a tabulation is made of the standard cost of the material in the product and the standard cost of material issued, the latter being adjusted to actual cost in the same manner as for the credits to the controlling account as previously explained. The actual cost of the material issued and the standard cost of the material in the product are now posted to the debit of the Material Work in Process accounts. The ratio between these two amounts is used as a means for adjusting the standard cost of credits to actual cost. You will note that the difference between the standard and actual cost in the material accounts shows the price difference only, but in the Material Work in Process account the difference now represents a combination of the difference due to variation in price from standard and in the quantity issued over or under standard. This variation is shown monthly by classes of product. If these records are of no further use than to ascertain what this difference is they are not worth the effort of making them. Previous to our present plan of accounting it was the custom when an up-to-date cost was called for, to refigure each item of material on the article, which required considerable work, when you consider an item like a coffee urn which is made of twenty-eight different parts consisting of nearly as many different sizes and gauges of material. Under the standard cost plan this cost is figured in detail but once. When a current cost is called for all that is necessary is to turn to our standard cost and apply to the material cost the ratio of standard to actual as shown in the work in process account. By doing so we take up the correct price adjustment and apply the quantity adjustment as a general charge over articles in the line.

In such material as sterling silver where the market is changing daily it is possible through the use of the standard costs to keep the accounts at the market prices and, if necessary, to charge or credit the profit and loss account with the amounts due to market fluctuations.

In case of material scrap the process is the same as for the material except that it is not always possible to allocate the actual

quantities to the various classes on account of the same material being used in several classes, and the scrap being thrown all together. As the work is completed the standard scrap is figured for each order and the total by class of product is used as a basis for distributing the actual quantities to the different classes of product.

Burden

All of the foregoing in regard to direct labor and material differs but very little from the usual methods followed in compiling this class of information. The subject of burden, however, presents an entirely different problem. When a standard cost plan is introduced it is a very radical move from the usual custom of distributing the burden by departments and then making further distribution to other departments.

The use of standard cost in the application of burden brings out very forcibly the fallacy of using the burden rates as a means of judging the efficiency of a department.

Particularly is this true if the burden is based upon direct labor, for if a foreman is very efficient and is able to produce his work with a minimum of direct labor, he is often criticized because his indirect expense is higher in relation to his direct labor than another department, the ratio of which seems to be lower. Often, if the facts are known, the department with the low rate of burden is very inefficient as regards the direct labor. It is not the intent in this article to enter into a discussion of the merits of the various means of distributing burden. In our case we have found that the standard direct labor hour is the best means for burden distribution for our class of work.

The first problem which confronted us in establishing the standard cost plan was to set standard burden costs for each department, and the separation of these items into those which were in the nature of fixed charges and those which varied with production. It is generally known that the burden charged to production tends to vary with the volume of production as a certain proportion of the expense is fixed. This feature of burden costs is the underlying cause for the effort made to decrease costs by increasing production.

In setting the standard burden rates, first consideration was given to the capacity of the plant running full time for one month which was considered as the standard production. This figure was translated into the number of man hours required in each department. The expenses necessary for operating the departments at full time were ascertained and grouped together under the heads of Indirect Labor, Supplies, Back Work, etc. These expenses were then further divided as to whether they were fixed or fluctuating charges.

The actual cost under each of these heads is tabulated for each department. These are summarized on what is known as the monthly cost summary sheet. This sheet is designed so as to show

all divisions of the cost both at actual and standard values. The standard burden earned in each department is figured through the application of the standard burden rates to the standard hours in the month's production. This standard burden is compared with actual and the difference is analyzed into a few main heads such as:—Variation in labor rates, efficiency of labor, quantity of supplies, price of supplies, loss in fixed charges due to the plant operating at less than standard time, price and quantity of material. A statement is sent to the factory executive monthly, showing the comparison of the actual cost with the standard cost by departments. This statement does not show a split up of what are known as non-productive departments to the productive departments, but treats every department as a producing unit and shows the amount of the actual expense in comparison with the standard expense earned. Such a statement gives the executive a means of determining just where his costs are increasing and it is not necessary for him to wade through a mass of figures and distributions before he finds such an item as for example , the cost of labor in the power plant. In the generally accepted system of burden statements it is the custom to make a monthly report which is drawn up so as to show the expenses by accounts in comparison with the month of the previous year. This statement looks very fine but in following through the accounts one usually discovers that at the end an amount is added, which often is in excess of the total of the other, and reads, "Proportion of Unclassified Expense." This unclassified expense often contains items which are far more important than those which are shown in detail. At the close of each month our statements show the amount of burden earned in each department in comparison with the actual expenses. Back work is a very important item in the silver industry and if a comparative statement of a department shows that the actual expense of this nature is more than the amount scheduled in a department, the foreman of the department is called upon for an explanation. As in the case of direct labor our accounts are so designed that if it is thought advisable to keep a close watch on any particular item of burden, detail daily reports can be sent to the foreman of each department of the cost under any head as compared with standard cost without disturbing the regular routine.

Cost Summaries

The cost summary sheet not only serves as a means for making the comparisons of the actual and standard costs, but is used also as a means of accumulating the total costs of each department by classes of product. The total cost of each class of product at actual and standard as made up on this cost sheet is charged to the Labor and Burden Work in Process accounts. The credits of the corresponding amounts are made to the controlling accounts from which the amounts are made. The relation between the standard and actual cost is also shown in this account by the use of ratios.

These ratios are used as a means of converting the standard cost of the credits to actual cost.

The next step in our accounting procedure is to transfer the cost of goods finished from the work in process accounts to the finished goods accounts and from there to the cost of sales accounts.

Under the detail cost plan it would be necessary to price each item at its latest cost which would mean a duplication of our present billing force, and in a great many cases it would not be possible to ascertain the cost of an article until a long period after the shipment was made.

With the use of standard costs the quantity produced of each article is extended at the standard cost and adjusted to actual cost by the use of the ratio shown on the debit side of the Work in Process accounts. At the same time the list price of the production is figured and this amount together with the actual cost are posted to the debit of the Finished Goods account and the actual and standard cost are posted to the credit of the Work in Process account. The relation between the actual costs and list amount in the Finished Goods accounts are now shown through the use of the ratio of the actual cost to the list amount.

As the large part of our product is sold at a discount from a list price the use of this list as a means of transferring the cost of the shipments to the Profit and Loss account has saved a great amount of clerical effort in determining the cost of the monthly shipments. As each invoice is prepared for tabulation, the discount or price list, class of product, salesman and shipping point are noted in code. This information is punched on tabulating cards and a monthly tabulation is made by classes of product. These amounts are further divided into the classes of prices at which the goods are sold. The net amount of the sales are brought up to their list value by the use of the discounts at which the goods are sold. The total list price of the shipments are now converted to actual cost by the use of the ratio of actual cost to list as shown in the Finished Stock accounts.

We have found that a further advantage to be gained from the use of standard cost is that of pricing our annual inventory. Before standard costs were used it was the custom to have the Cost Department work nights and Sundays before the first of the year in an effort to be certain that all costs were brought up to date so as to be available for inventory purposes. It often happened that after the inventory was completed it was desired to make changes in certain base prices of metal, which meant that a large part of the cost had to be refigured and the closing of the books delayed. We are now using the standard costs as a basis for our inventory, and if it is necessary to make changes after the inventory is finished, it is only necessary to change the ratios to correspond to the new prices. This procedure has enabled us to get the inventories of our plants at a much earlier date than before and has saved a great deal of wear and tear on the nerves of the clerical force of the Cost Department.